

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions and listings of claims in the application:

Listing of Claims:

Claim 1 (currently amended): A passive cooling system for removing heat from a component located within a passenger compartment of a vehicle, the vehicle having an external portion, the passive cooling system comprising:

a heat pipe within the component, the heat pipe communicating between the component and the external portion of the vehicle, the heat pipe containing a liquid, the heat pipe having an evaporator section at least partially ~~mounted~~ embedded within the component in abutting contact with ~~[[a]] one or more surfaces of the component for conductive heat transfer with the component surface~~ such that all or substantially all heat transfer between the evaporator section and the component surfaces is conductive heat transfer and a condenser section located at the external portion of the vehicle such that when a temperature at the evaporator section is greater than a temperature at the condenser section, heat is passively transferred from the component to the external portion of the vehicle.

Claim 2 (original): The passive cooling system of claim 1 wherein the component is an instrument panel.

Claim 3 (original): The passive cooling system of claim 2 wherein the instrument panel has an outer layer composed of a thermoplastic polymer and wherein the evaporator section of the heat pipe is thermally connected to the thermoplastic layer.

Claim 4 (original): The passive cooling system of claim 3 further comprising a plurality of heat pipes.

Claim 5 (original): The passive cooling system of claim 3 wherein the thermoplastic polymer is polyvinyl chloride.

Claim 6 (original): The passive cooling system of claim 3 further comprising a thermally conductive film wherein the evaporator section of the heat pipe is thermally connected

to the thermally conductive film and the thermally conductive film is embedded in the thermoplastic layer of the instrument panel.

Claim 7 (original): The passive cooling system of claim 6 wherein the heat pipe is attached to the thermally conductive film and the film is adhered to the thermoplastic layer of the instrument panel.

Claim 8 (original): The passive cooling system of claim 6 wherein the thermally conductive film is a metal selected from the group consisting of copper, molybdenum, gold, nickel, stainless steel, niobium, cobalt, chromium, beryllium, magnesium, platinum, iridium, bronze, silver, tin, titanium, iron, tungsten, zinc and tantalum.

Claim 9 (original): The passive cooling system of claim 6 wherein the thermally conductive film is a ceramic material selected from the group consisting of silicon carbide, alumina and aluminum nitride.

Claim 10 (previously presented): The passive cooling system of claim 6 wherein the thermally conductive film is a carbon-based material selected from the group consisting of a carbon-fiber composite, carbon foam material and diamond.

Claim 11 (original): The passive cooling system of claim 7 further comprising a bracket for accepting the heat pipe wherein the bracket is attached to the thermally conductive film.

Claim 12 (previously presented): A passive cooling system for an instrument panel in a vehicle, the passive cooling system comprising:

a heat pipe having an evaporator section in communication with a condenser section, the evaporator section embedded in the instrument panel; and

an external portion of the vehicle at a temperature lower than the temperature of the instrument panel, wherein solar heat absorbed at the instrument panel is transferred to the evaporator section of the heat pipe, onto the condenser section of the heat pipe and dissipated to the external portion of the vehicle[.];

wherein the heat pipe further comprises a closable valve for substantially thermally disconnecting the evaporator section of the heat pipe from the condenser section of the heat pipe;

wherein solar heat absorbed at the instrument panel is at least partially trapped in the evaporator section of the heat pipe when the valve is in a closed position; and wherein the valve is triggered to close or open by a manual switch.

Claim 13 (original): The passive cooling system of claim 12 wherein the instrument panel has an outer layer composed of a thermoplastic polymer and wherein the heat pipe is embedded in or adjacent to the outer thermoplastic polymer layer.

Claim 14 (original): The passive cooling system of claim 13 further comprising a thermally conductive film wherein the evaporator section of the heat pipe is thermally connected to the film and the film is embedded in the thermal plastic polymer layer of the instrument panel.

Claim 15 (original): The passive cooling system of claim 14 further comprising a bracket attached to the thermally conductive film for accepting the heat pipe, wherein the thermally conductive film is adhered to the thermoplastic polymer layer of the instrument panel.

Claim 16 (original): The passive cooling system of claim 15 further comprising a thermally conductive grease for coating the heat pipe, wherein the thermally conductive grease facilitates the transfer of heat from the bracket to the heat pipe.

Claim 17 (original): The passive cooling system of claim 12 wherein the external portion of the vehicle is a side body panel.

Claim 18 (original): The passive cooling system of claim 12 wherein the external portion of the vehicle is a roof.

Claim 19 (original): The passive cooling system of claim 12 wherein the heat pipe is further defined as comprising copper and as containing water suitable for transferring the solar heat absorbed at the instrument panel to the external portion of the vehicle.

Claim 20 (canceled)

Claim 21 (previously presented): The passive cooling system of claim 12 wherein the valve is triggered to close at a preset instrument panel temperature.

Claim 22 (previously presented): The passive cooling system of claim 12 further comprising a passenger compartment within the vehicle, wherein the valve is triggered to close at a preset air temperature within the passenger compartment.

Claim 23 (canceled)

Claim 24 (original): The passive cooling system of claim 12 wherein the instrument panel has an inner layer composed of polyurethane and wherein the heat pipe is embedded in or adjacent to the inner polyurethane layer.

Claim 25 (original): The passive cooling system of claim 12 wherein the instrument panel has an inner layer composed of a thermoplastic polymer and wherein the heat pipe is embedded in or adjacent to the inner thermoplastic polymer layer.

Claim 26 (currently amended): A method for passively controlling the temperature of an instrument panel in a vehicle, the method comprising:

obtaining a heat pipe having an evaporator section in communication with a condenser section;

embedding the evaporator section of the heat pipe in the instrument panel, wherein the evaporator section is at least partially in heat transfer contact with at least one surface of the instrument panel; [[and]]

securing the condenser section of the heat pipe to an external portion of the vehicle[.]; and

providing one or more valves for blocking flow between the evaporator and condenser sections of the heat pipe, wherein the valves are switch operable to be substantially fully closed or opened based on one or more sensed temperatures.

Claim 27 (original): The method of claim 26 wherein the instrument panel has an outer layer composed of a thermoplastic polymer and the embedding of the evaporator section of the heat pipe in the instrument panel further comprises: connecting the evaporator section of the heat pipe to a thermally conductive film and adhering the film to the thermoplastic polymer layer of the instrument panel.

Claim 28 (previously presented): A cooling system for an instrument panel in a vehicle, the passive cooling system comprising:

a portion of the vehicle at a lower temperature than the instrument panel; and

means for passively removing heat from the instrument panel to the external portion of the vehicle;

wherein the passive heat removal means comprises a plurality of heat pipes with evaporator sections in conductive heat transfer contact with at least one surface of the instrument panel and condenser sections mounted proximal to the portion of the vehicle at the lower temperature; and

wherein the passive heat removal means comprises one or more valves for blocking flow between the evaporator and condenser sections of the heat pipes, the one or more valves being substantially fully closed or opened by an automated controller based on one or more sensed temperatures or by a manual switch.

Claim 29 (canceled)

Claim 30 (currently amended): The passive cooling system of claim 1, wherein the external portion comprises a substantially vertical side panel of the vehicle and wherein the condenser section is mounted to an interior surface of the side panel.

Claim 31 (previously presented): The passive cooling system of claim 30, wherein the condenser section is mounted lower within the vehicle than the evaporator section and wherein a lowest portion of the condenser section is less than about 1 vertical foot from a lowest portion of the evaporator section.